INFORMATION MANAGEMENT FOR TRANSPORTATION RESEARCH AND DEVELOPMENT

Part II: Coordination of Information Sources

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PART II: COORDINATING OF TRANSPORTATION INFORMATION SOURCES

New information technologies have undoubtedly increased both the capabilities and productivity of researchers, but proliferation of numerous uncoordinated database networks has led to problems of unique proportions. Existence of these independent networks has made it difficult for researchers to keep track of existing, planned, and developing research efforts. Moreover, problem areas associated with use of these information technologies include issues of skyrocketing costs, absence of simplified consistent standards for operation, and lack of interconnection among computer systems.

To ensure effective, efficient use of valuable resources, as well as maximum return on transportation investment, information concerning past, ongoing, and planned work must be readily and inexpensively available. The answer is creation of a systematic mechanism ensuring effective information sharing, and affordable, timely, comprehensive access to information.

In providing an inventory of major transportation information sources, Part I of this discussion paper surveyed the roots of the problem, and demonstrated clearly that the greatest challenge facing researchers is ability to cover all sources of information comprehensively before embarking on a research endeavor. Part II defines the problem, states goals and objectives, indicates barriers to creation of a coordinated database, and suggests alternative models for a nationally coordinated transportation database.

This discussion paper proposes that RAC members examine the issues of database coordination, thus paving the way for development of an action plan to achieve more effectively coordinated transportation R&D efforts both nationally and internationally.

The purpose of Part II is to provide a platform for RAC and other meeting participants to establish a framework for an integrated national transportation database. It identifies the goals and objectives in creating such a database, and proposes alternative models for an integrated information system. It is intended to aid RAC members in sorting out these issues and formulating an action plan.

A. Definition of the Problem

Transportation information available to the R&D community is fragmented, dispersed, and difficult to acquire. There is no unified information system (such as a national library or a network of online systems) bringing together sources of research information. It is becoming increasingly difficult for transportation researchers to keep track of numerous existing and ongoing research efforts. Moreover, many researchers do not know about the libraries, networks, and organizations where information is stored, thus making them liable to duplication of effort and waste of valuable resources.

B. The Goal

The goal is to create a standard mechanism providing researchers with comprehensive, simple, affordable, and timely access to existing data, thus cutting cost and time, improving productivity, and ensuring effectiveness, efficiency, and maximum return on investment.

C. The Objectives

The primary objective is to provide a reliable, effective communication medium to the R&D community through:

1. Organization: Making existing collections of data better coordinated and less fragmented.
2. Simplicity: Making information easier to use.
3. Affordability: Making information less costly to acquire.
4. Comprehensiveness: Making information currently not accessible readily available to everyone, everywhere.
5. Timeliness: Reducing the amount of time spent on literature reviews and retrieval of information.
6. Accuracy: Ensuring the quality of the information retrieved.

D. Participants in the Information Production/Collection/Dissemination Process

Formulation of an effective solution to the problems facing the R&D community requires accommodating the needs of all those involved. The following is a list of those engaged in production, dissemination, and collection of data:

1. Government agencies.
2. Consultants.
3. Engineering/ manufacturing firms.
4. Construction firms.
5. Educational institutions.
6. Professional societies.
7. Non-profit organizations.
8. Public information/data resources.
9. Private information/data resources.

E. User Needs

Each user may have a different view concerning coordinating the transportation database, depending on what is perceived as viable and feasible. The interest of for-profit organizations in providing services is income. Professional societies' interest is in improved services to members. Government agencies, however, are encouraging competitiveness throughout the country. Non-profit organizations, on the other hand, seek expansion of services and new business opportunities. Consultants seek good information at a reasonable cost. Educators seek timeliness and cost reduction. Of particular concern are the for-profit organizations, which undoubtedly have a great stake in any change in the status quo.

F. Framework for a Coordinated Transportation Database

Experience gained from the success of the National Library of Medicine and failure of a 1962 effort to create a United Engineering Information Service, have identified five basic ingredients for success of a coordinated national transportation database:

1. Existence of demand for improved transportation information service, i.e., a market for improved service,
2. Effective leadership from the user rather than the provider of service,
3. Strong commitment to information sharing and strong public support from all information suppliers (producers, collectors, and disseminators).

4. Responsiveness to needs of all parties involved in the process, i.e., willingness to accommodate concerns and interests of all users, and

5. Effective use and adoption of new technologies to address needs of users and providers.

G. Alternative Models for a Coordinated Database

The alternatives outlined here introduce the concept of a nationally coordinated transportation database, providing a simple general approach to how that concept could be implemented. Discussion in this section in no way intends to provide a detailed operational plan (that should be undertaken by specialized system designers) or to present a clearcut solution, but rather directs attention to the issues, and possible approaches to problem solving.

1. Alternative 1: A National Transportation Library (NTL)

The concept of an NTL may be based on the examples of the National Library of Medicine and the National Library of Agriculture. These provide excellent models for an NTL, evolving from small collections of publications to those that are internationally prominent. Through a network of 3500 local libraries, 130 research resource libraries, and 8 regional libraries, the National Library of Medicine provides rapid, inexpensive computer-based bibliographic database services to its users.

Like the National Library of Medicine, the NTL proposed here would provide a national transportation information system to integrate transportation institutions nationally with electronic linkages. Information sources thus will be NTL resources.

NTL could be either place-centered, or exist only in electronic form. Either form would build on the concept of creating a network of transportation libraries. A place-centered library, which would also rely primarily on electronic networking with other local and regional transportation libraries, does not have to be a new organization; instead, one of the existing transportation libraries could be designated as home for NTL. The primary function of an NTL would be acquisition, storage, preservation, exchange, and dissemination of transportation information.

However, NTL does not have to be place-centered. An electronic form, if well-structured, would achieve the same objectives. Through their computers, users could have access to a wide range of information from a variety of sources, available in different locations. Using the electronic library, the entire network of information could be shared anytime, anywhere. A true electronic library could be an effective information infrastructure between sources of information and its seekers.

An example of this electronic library is the Transportation Library subfile (TLIB) provided by TRIS, which contains records from two major transportation libraries -- the Institute

of Transportation Studies Library at the University of California, Berkeley, and the Transportation Library at Northwestern University. These two libraries hold major collections on transportation, together annually cataloging an estimated 6,000 books and reports and indexing about 15,000 articles.

The TLIB subfile contains more than 73,000 entries, growing by about 600 citations monthly. These citations cover all modes of transportation, physical distribution, and shipment of goods. TLIB could thus serve as the foundation, the first bricks of a national electronic transportation library providing comprehensive access to transportation information.

Operational issues include soliciting commitment and dedication of transportation libraries nationwide to a cooperative information-sharing initiative. Private-sector vendor interests could be accommodated by making NTL's database available for them to sell to users not having direct access to NTL. The role of the USDOT Library also should be discussed and defined.

2. Alternative 2: A National Transportation Network (NTN)

While the NTL concept is a centralized approach to information sharing, the concept of an NTN is decentralized. It basically calls for better management and more efficient organization of existing transportation databases to allow greater and simpler access to information. This approach targets existing information networks by providing linkages among them to create a single channel or "one-stop shopping,"where the user can have complete access to existing transportation information sources. Internet could provide a possible vehicle for realizing this concept. A wide range of available transportation databases are now available through Internet, which could serve as a unifying structure for existing transportation information and the ultimate window for transportation databases, by providing gateways between networks.

This model requires a strong partnership of all players, including professional societies, academia, state and local governments, the private information industry, and federal agencies. Success of this network will depend primarily on a coalition of information providers, and general and private vendors in particular.

H. Conclusion

The challenge facing the transportation research community is development of a systematic approach to information sharing. Although information technologies are considered major tools toward realizing the ultimate goal of nationally and internationally coordinated R&D efforts, the journey has hardly begun. Achieving this coordination will enhance research productivity, and ensure more efficient and effective use of scarce resources.

This discussion has outlined a simple general approach to integrating transportation information sources. Extensive studies, however, are needed to assess the following:

1. Identifying the players (producers/collectors/disseminators/users) and assessing their needs.

2. Conducting a cost-benefit analysis of each alternative.

3. Structuring the operational, financial, and organizational details of the system.

4. Conducting tests of the various alternatives.

Finally, it should be emphasized that unless an initiative is taken with full support of all participants, it is doomed to failure. The structure of any initiative should be fully responsive to the needs of both the user and the provider.

SUGGESTED READING

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